

A photograph taken from inside an airplane, looking out through a circular window. The window frame is dark and metallic. Outside, the sky is a deep blue, and a thick layer of white clouds stretches across the horizon. The wing of the airplane is visible on the right side of the frame, extending towards the horizon. The overall scene is bright and clear.

Aircraft Analysis from Aviation Accident Data

A view from an airplane window showing the wing and clouds.

Overview

☐ Brief intro to the aviation industry

The aviation industry is a vital component of the global economy, facilitating fast and efficient transportation of people and goods across long distances.

☐ Purpose of the analysis

To support our company's strategic entry into the aviation industry by analyzing historical accident data focusing on aircraft types, flight phases, and contributing factors in order to uncover key safety risks and provide actionable insights that will guide operational planning and risk management decisions.

A view from an airplane window showing the wing and clouds.

Business Understanding

As part of its diversification strategy, our company is expanding into the aviation sector specifically the operation of aircraft for both commercial and private use.

By analyzing aviation accident records, this project aims to uncover patterns related to accident frequency, flight phases, and fatality rates. These insights will directly support the Head of the Aviation Division in identifying safer and more reliable aircraft for purchase.

A view from an airplane window showing the wing and clouds.

Business Understanding

Key Business Questions

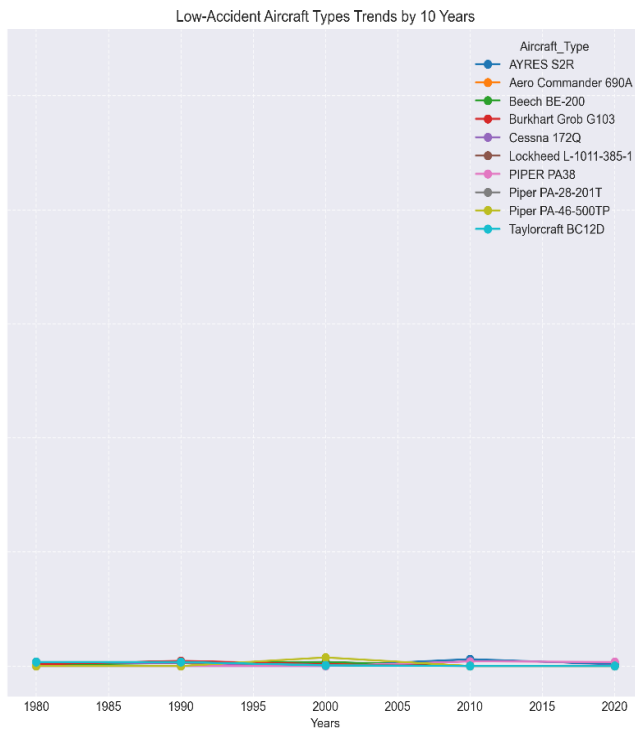
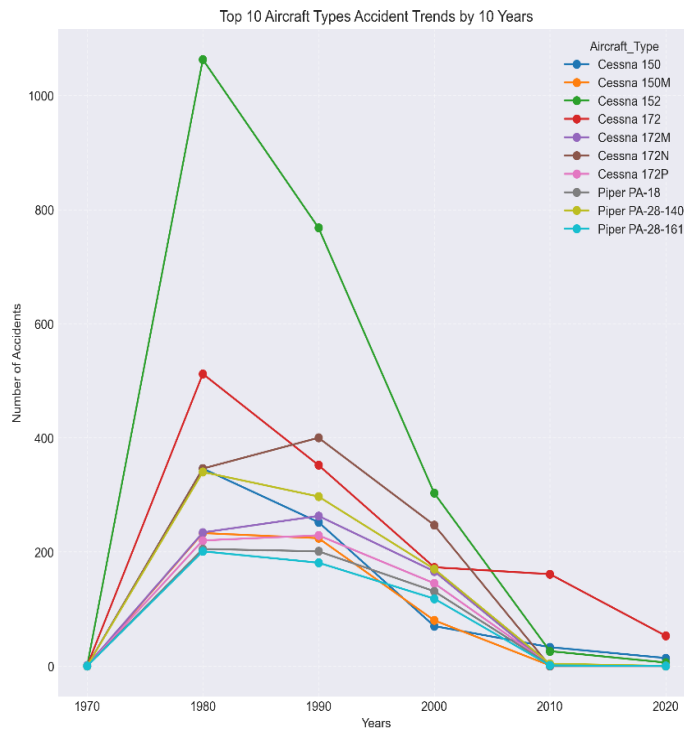
- Which aircraft types historically had the highest and lowest number of accidents?
- During which phases of flight are accidents most likely to occur?
- Which aircraft types are associated with the highest number of fatalities?
- How does the purpose of flight impact accident rates?
- What data-supported recommendations can be made to minimize risk when selecting aircraft?

A view from an airplane window showing the wing and clouds.

Data Analysis

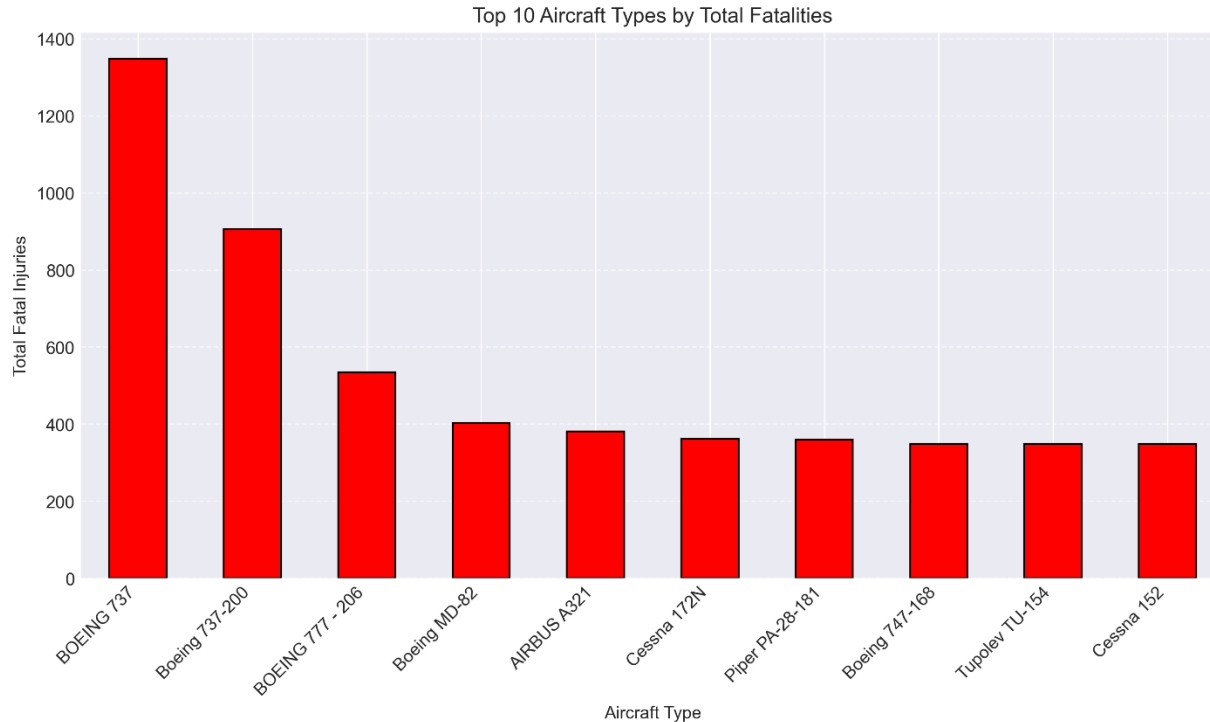
The goal of the analysis was to discover important trends and safety insights by examining different aspects of aviation accidents, such as aircraft type, flight phase, fatalities, and purpose of flight. Key visualizations in the next slides.

Data Analysis (Accident Trends Over Time)



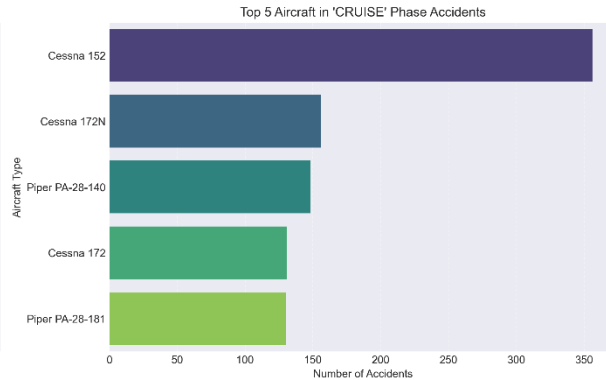
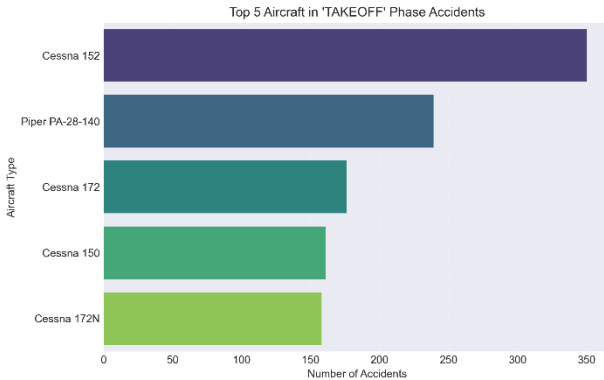
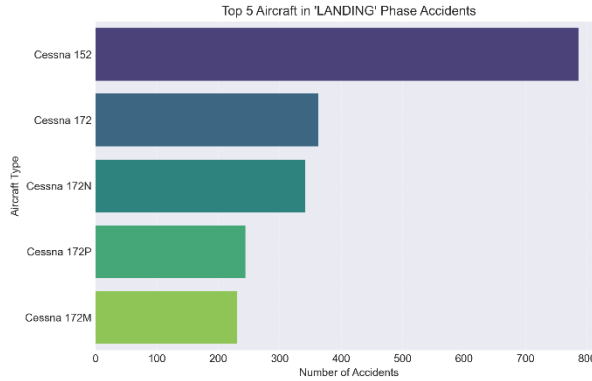
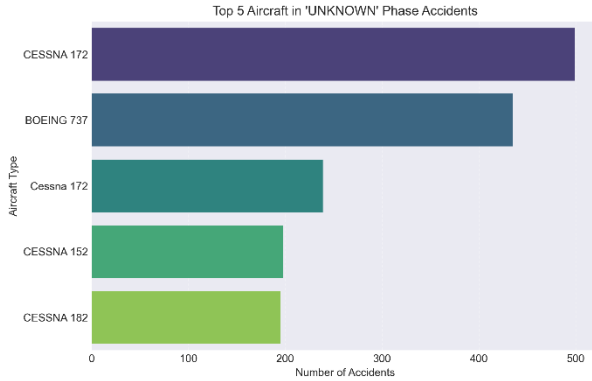
➤ Cessna aircrafts have the most accidents recorded with high accidents recorded between 1970 and 2000

Data Analysis (Fatalities by Aircraft Type)



- The chart shows which aircraft types are deadliest based on total fatalities, even if they didn't crash often.
- The analysis showed that the Boeing 737 and Boeing 737-200 accounted for the highest number of fatalities across all aircraft types in the dataset.

Data Analysis (Accidents by Phase of Flight)

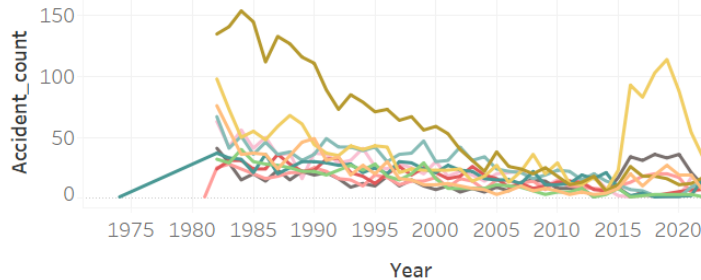


➤ Landing, takeoff, and cruise phases account for most of the accidents

Data Analysis (Interactive Dashboard)

AIRCRAFT ANALYSIS DASHBOARD

Accident Trends



Aircraft Type

- Cessna 150
- Cessna 150M
- CESSNA 152
- Cessna 172
- Cessna 172M
- CESSNA 172N
- Cessna 172P
- CESSNA 180
- Cessna 182
- PIPER PA-28-140

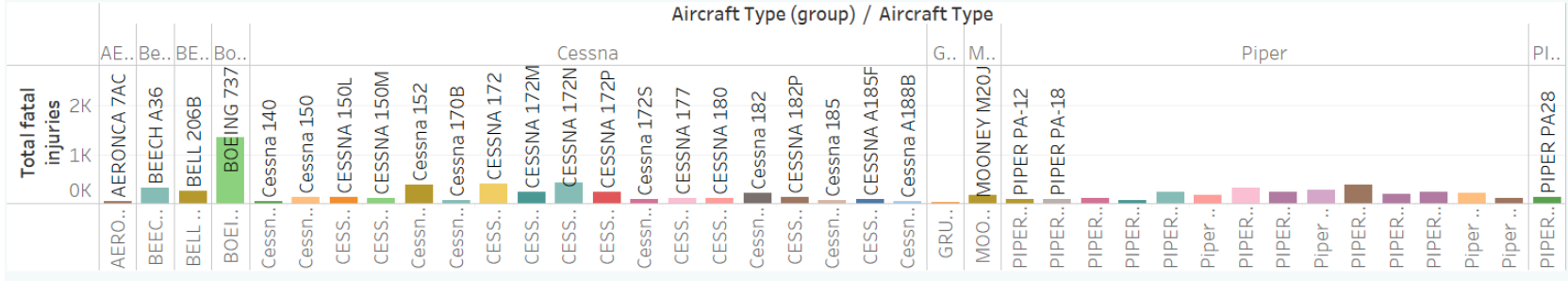
Broad phase of flight



Broad phase of flight

- Approach
- Climb
- Cruise
- Descent
- Go-around
- Landing
- Maneuvering
- Standing
- Takeoff
- Taxi

Fatalities by Top Aircrafts





Business Recommendations

The analysis of aircraft accident trends, fatality rates, and flight purposes leads to the following strategic recommendations:

- ❑ Enter the Commercial Aviation Sector, focusing on executive and corporate operations, where safety performance is more favorable.
- ❑ Avoid High-Incident Aircraft such as the Cessna 152 and Cessna 172, which show a higher frequency of accidents.
- ❑ Prioritize multi-engine Aircraft with low incident rates and strong safety records, especially during critical phases like takeoff and landing.
- ❑ Start with Smaller, Safer Jets to minimize operational risk and gain industry experience.
- ❑ Scale Gradually while maintaining a safety-first approach, positioning the company as a reliable and responsible aviation provider.



Next Steps

To support a safe and informed market entry, the following steps are recommended:

- ❑ **Conduct a Detailed Aircraft Evaluation**
Shortlist low-incident, multi-engine jets aligned with executive and corporate needs.
- ❑ **Engage Regulatory and Safety Experts**
Ensure compliance with national and international aviation safety standards.
- ❑ **Recruit Skilled Personnel and Pilots**
Focus on pilots with strong safety records and experience in corporate aviation.
- ❑ **Develop a Safety-First Operational Plan**
Include scenario-based training, emergency protocols, and phased onboarding of aircraft.
- ❑ **Continue Data-Driven Monitoring**
Integrate ongoing analytics into operations to refine strategy and manage risk.

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